

Name: _____

at1124exam: Radicals and Squares (v811)

Question 1

Simplify the radical expressions.

$$\sqrt{45}$$

$$\sqrt{28}$$

$$\sqrt{75}$$

$$\frac{\sqrt{3 \cdot 3 \cdot 5}}{3\sqrt{5}}$$

$$\frac{\sqrt{2 \cdot 2 \cdot 7}}{2\sqrt{7}}$$

$$\frac{\sqrt{5 \cdot 5 \cdot 3}}{5\sqrt{3}}$$

Question 2

Find all solutions to the equation below:

$$4(x + 8)^2 - 8 = 92$$

First, add 8 to both sides.

$$4(x + 8)^2 = 100$$

Then, divide both sides by 4.

$$(x + 8)^2 = 25$$

Undo the squaring. Remember the plus-minus symbol.

$$x + 8 = \pm 5$$

Subtract 8 from both sides.

$$x = -8 \pm 5$$

So the two solutions are $x = -3$ and $x = -13$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 18x = 88$$

$$x^2 - 18x + 81 = 88 + 81$$

$$x^2 - 18x + 81 = 169$$

$$(x - 9)^2 = 169$$

$$x - 9 = \pm 13$$

$$x = 9 \pm 13$$

$$x = 22 \quad \text{or} \quad x = -4$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 2x^2 + 20x + 58$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 2 .

$$y = 2(x^2 + 10x) + 58$$

We want a perfect square. Halve 10 and square the result to get 25 . Add and subtract that value inside the parentheses.

$$y = 2(x^2 + 10x + 25 - 25) + 58$$

Factor the perfect-square trinomial.

$$y = 2((x + 5)^2 - 25) + 58$$

Distribute the 2.

$$y = 2(x + 5)^2 - 50 + 58$$

Combine the constants to get **vertex form**:

$$y = 2(x + 5)^2 + 8$$

The vertex is at point $(-5, 8)$.